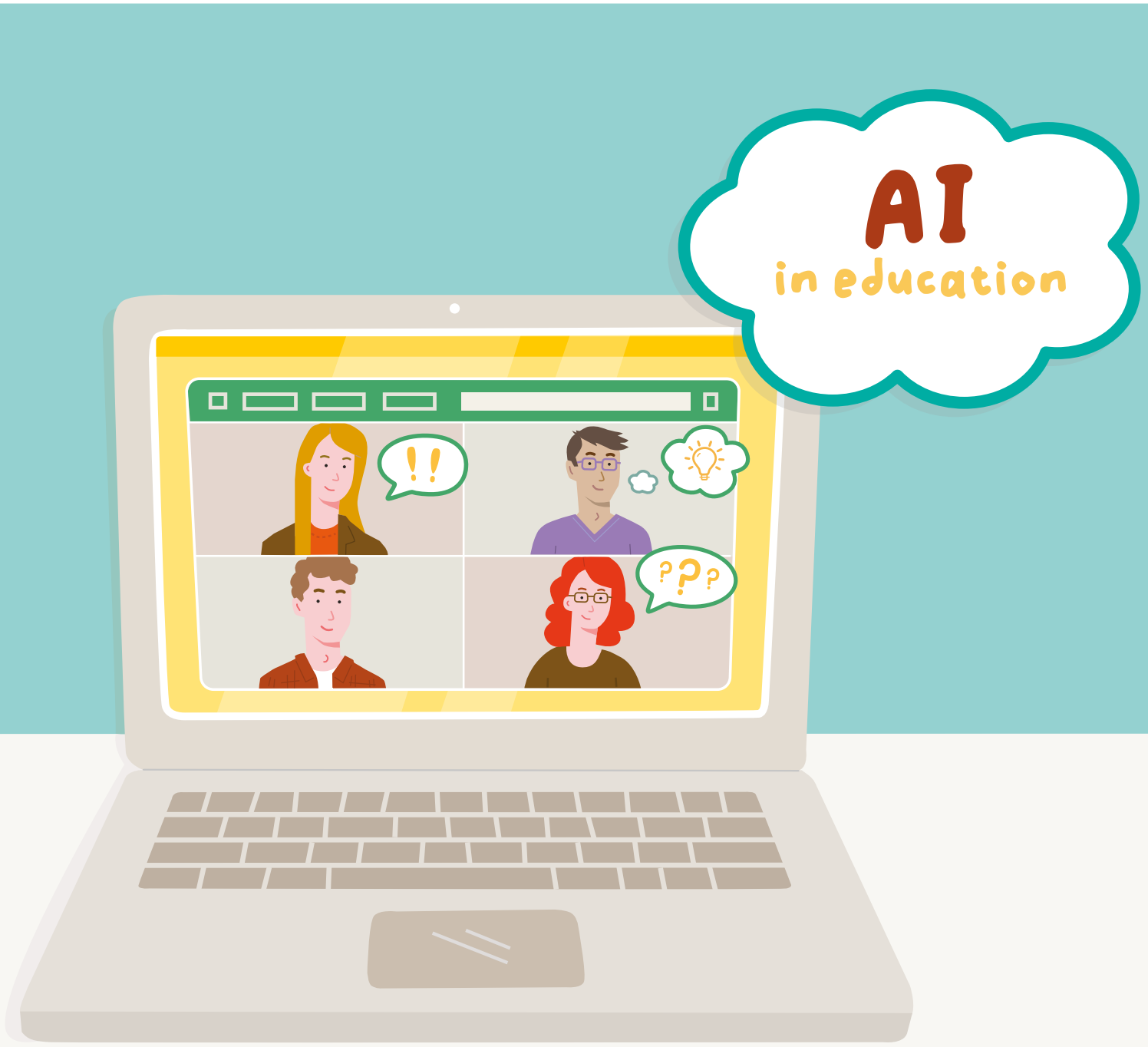
CIDREE

Artificial Intelligence:
Preparing ourselves to prepare others

An audit of member organisations' curriculum response to AI – a CIDREE project



Contents

This audit report was prepared by the National Council for Curriculum and Assessment (NCCA), Ireland, as part of a wider project focusing on artificial intelligence in education. The project is co-led by CIDREE member organisations NCCA, Ireland; Education Scotland; SCRIPT, Luxembourg.

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President's Foreword

'With the project 'Artificial Intelligence: Preparing ourselves to prepare others', CIDREE is addressing one of the most current and far-reaching developments in our modern society.

Artificial Intelligence (AI) has the potential to transform society, but it also brings challenges. It is important to consider both sides of the coin. AI can be a powerful tool to address societal issues and improve education systems. However, ethical and societal risks should not be overlooked. A well-considered strategy is needed to implement AI in a responsible way. By carefully weighing all aspects, well-informed decisions can be made about how AI can be used to support education systems and curriculum development.

The project has the ambition to address the various challenges of Artificial Intelligence and explores AI from different perspectives:

- the evolution of AI both generally and within the education system
- the approaches to the development of national laws and policies in response to AI and AI in education
- the different national curriculum developments

The project is not only ambitious in the different perspectives of AI, with the project we also gather unique data from CIDREE members from different parts of Europe. This report is the result of a process of intensive collaboration and offers much material for further collaboration and new CIDREE projects."

Ingrid Vanhoren

AHOVOKS (Belgium [Flanders])

CIDREE President 2024–2025

Introduction

Artificial Intelligence: Preparing ourselves to prepare others is a CIDREE project. CIDREE signifies the Consortium of Institutions for Development and Research in Education in Europe and is a network of educational organisations involved in curriculum development and/or educational research.

This project was established as a result of a common desire to explore how member organisations may be responding to Artificial Intelligence (AI) from the perspective of education and is expected to take place over a number of years. The project is composed of three strands, each with a distinct function, focus and intended outcomes. The three organising members; **Ireland**, **Scotland** and **Luxembourg** have taken responsibility for a single strand accordingly. The National Council for Curriculum and Assessment (NCCA), **Ireland** is leading an audit of AI in education across member organisations. Education **Scotland** are leading strand two which involves an exploration of professional learning and development in AI for those working on innovation, curriculum development and policy-making process in education, while SCRIPT **Luxembourg** are leading strand three which will focus on documenting learning experiences within AI in curriculum development and how they transact within the classroom. A research strand was considered, however, given the topical nature of AI, it was considered likely that AI will feature as a topic of a CIDREE yearbook in the coming years.

As outlined, the goal of strand one is to produce an audit report which tracks emerging laws and policies on AI in general, and within education, across member organisations. There is a particular focus on a country's response to AI through curriculum and assessment developments. This document forms the initial audit conducted in the Spring of 2024. Further data gathering will occur to update the audit and to track progression across different initiatives in 2024 and 2025.

Network organisations were encouraged to engage in a review of practice in the area of AI and education within their context and were invited to submit synthesised responses to an audit questionnaire in the Spring of 2024. The questionnaire was piloted initially by the three lead organisations and was refined accordingly. A further five member organisations contributed to the audit: Agentschap voor Hoger Onderwijs, Volwassenenonderwijs, Kwalificaties en Studietoelagen, AHOVOKS, (**Belgium**); National Agency for Education, Skolverket, NAE (**Sweden**); Zavod Republike Slovenije za šolstvo, ZRSŠ (**Slovenia**); Netherlands Institute for Curriculum Development, SLO (**The Netherlands**) and Swiss Coordination Centre for Research in Education, SCCRE (**Switzerland**) for Education, **Sweden**, Swiss Coordination Centre for Research in Education, **Switzerland** and SLO-National Institute for Curriculum Development. **The Netherlands**, with commitments from other organisations to engage with the audit at a later stage.

The audit questionnaire was composed of four sections: (1) general fact-finding questions which focused on education systems and their funding structures, (2) an opportunity to provide feedback on an overview of AI (3) questions on a country's law or policy on AI and (4) questions centred around approaches to curriculum innovation and development in response to AI.

This audit intends to present information gathered through the audit questionnaire through two distinct approaches. Data presented by participating countries is first considered collectively with trends, patterns and examples of practice presented and discussed before focusing on specific examples of innovative practice, which are outlined in the sections that follow. Each section has been designed to be distinct, and is presented so that the reader can engage with a particular area of interest within AI.

Section One, Artificial Intelligence, a global context
This section has relevance for all member organisations as it provides a synthesised overview of the evolution of AI both generally and within the education system. Links to referenced documents are embedded within, to support the reader and their engagement with this section.

Section Two, National policy on Artificial Intelligence and education
This section synthesises data from participating countries on the approaches to the development of national laws and policies in response to AI and AI in education.

Section Three, Curriculum developments that support effective engagement with Artificial Intelligence
Here we consider the different national curriculum developments across the network organisations, which provide opportunities for students to develop competencies that support their responsible and effective engagement with AI.

Section Four, Curriculum developments specific to Artificial Intelligence
National curriculum responses which are specific to AI in education are considered in this section. Supporting professional learning and approaches to AI in assessment are also discussed.

Two supporting appendices present a summary of data provided by each country in tabular form.

Appendix One > (Table 1–4) presents summary information on:

- The structure of the education system in each country
- An overview of digital skills and AI in the primary and post-primary curricula in each country
- The model of funding used to support digitisation.

This summary information is presented for each of the participating countries and can be accessed directly by clicking on the emboldened name:

Belgium (Flanders) > **Ireland >** **Luxembourg >** **Scotland >** **Slovenia >**
Sweden > **Switzerland >** **The Netherlands >**

Appendix Two > relates to the national policies, laws and guidelines in each country specific to the use of AI (**Table 1 >**) and to the use of AI in Education (**Table 2 >**). This appendix identifies what is happening in *each* of the participating countries. Links to all relevant national documentation are provided within this appendix.

Section One:
Artificial Intelligence, a global context

This section provides an overview of Artificial Intelligence and details the evolution of global law and policy in response to both AI in general, and AI in education. Links to documents discussed are provided and the content has relevance for all member organisations.

The **OCED (2023) >** defines an AI system as

> *a machine-based system, that for explicit or implicit objectives, infers from the input it receives how to generate outputs such as predictions, content, recommendations or decisions that can influence physical or virtual environments. AI systems differ in their levels of autonomy and adaptiveness after deployment*

The use of AI in everyday life, and in work and education, has been a topic of interest for researchers and policymakers in recent years. Discussion on generative AI, a category of AI algorithms that generates new outputs based on the data they have been trained on, and its role and influence within education has accelerated since the launch of a generative AI tool, Chat GPT, in November 2022. Chat GPT is an example of a Large Language Model (LLM) that enables human-like conversations and can predict the next word in a sentence. In addition, they can be combined with a standard data search to improve accuracy, such as those incorporated into search platforms, like Bing and Google. AI tools can quickly generate text and so concerns regarding plagiarism are at the forefront of discussions on the use of AI within the current education system. This has led to some jurisdictions and institutions seeking to ban these tools, though others are seeing this as an opportunity to rethink how they teach and assess student learning.

AI has been described by many as a double-edged sword, providing both benefits and risks to the user and society in general. This analogy would not be considered unique and has been used to describe various other technologies, such as the internet, over the years. The role of policymakers is to take effective action to support and maximise the benefits, while minimising the risks and devloping trust in the process. The move towards AI and AI regulation has been gradual with many countries and institutions publishing AI strategies. **China's Next Generation AI Development Plan >** was published in 2017, the EU Artificial Intelligence for Europe Strategy was published in 2018, and followed in 2019 by the United States **Executive Order on the American AI Initiative >**.

In 2018, the EU appointed an independent high-level expert group on AI to work on a third pillar of the strategy; to support an ethical and legal framework for AI, and in April 2019, the expert group published **The Ethics Guidelines for Trustworthy Artificial Intelligence (AI) >**.

According to the guidelines ethical AI termed trustworthy AI, should be:

1. Lawful – the need to comply with all applicable laws and regulations
2. Ethical – the need to comply with ethical principles and values
3. Robust – robust from a technical perspective to prevent hacks and data leaks

Ethical guidelines on AI are a description of where a country or institution stands in relation to AI, supporting and maximising the benefits, while minimising the risks. Hence, the question emerges; what is considered to be good ethical policy? Policymakers need to work towards an accepted definition of what is considered "good", and one that is accepted by the majority of their constituents. In addition, a universally accepted definition of what is ethically good in AI needs to be accepted by the majority on a global *basis*, in order for the policy to be adopted and successful. To determine what is ethically good about how to interact with AI, the expert group proposed to look at the framework of fundamental rights as outlined in the EU Charter. From an initial review of the five fundamental rights, four broad ethical principles were developed: (1) respect for human autonomy, (2). prevent harm, (3) fairness and (4) explicability.

Moving from these broad principles, seven key requirements were developed to support trustworthy AI:

1. **Human Agency and Oversight** – what oversight mechanisms need to be put in place to respect human autonomy?
2. **Technical Robustness and Safety** – what technical robustness and safety mechanisms need to be put in place, to ensure you mitigate harm?
3. **Privacy and Data Governance** – what data protection and governance procedures are employed to ensure high quality data generates high quality outputs?
4. **Transparency** – three categories of transparency include traceability and explainability in relation to decision making process and appropriate communication of the limitations of the system.
5. **Diversity, Non-discrimination and Fairness** – ensuring bias in AI systems is addressed, while also supporting universal design to support accessibility.
6. **Societal and Environmental Well-being** – awareness of the energy consumption associated with an AI system.
7. **Accountability** – considering how to make the AI system auditable to ensure you can check if something went wrong and to document negative consequences.

In July 2020, the expert group published a supporting **Assessment List For Trustworthy Artificial Intelligence (ALTAI) >**, a practical tool that translates the Ethical Guidelines into an accessible and dynamic self-assessment checklist for developers and deployers of AI systems.

One of the most significant developments in the regulation of AI is the **AI Act >** which was politically agreed by the three EU institutions in December 2023 and was adopted on the 13th March 2024. The US currently has an **AI Bill of Rights >** in development. In addition, leading AI companies have made voluntary commitments to the White House to develop provenance tools, such as watermarking. However, the EU's AI Act is the the first state legislation for AI in the world, creating binding rules on transparency,ethics and more for an AI system or entity operating in the EU market. It is considered a landmark bill that would mitigate harm in areas where using AI poses the biggest risk. This includes a requirement to notify people when they are interacting with an AI system, labelling AI generated content, and designing system to detect same.

The cornerstone of the AI act is a classification system that determines the level of risk an AI technology could pose to the health and safety or fundamental rights of a person. It includes a framework of four tiers: unacceptable, high, limited and minimal. AI systems with limited to minimal risk include spam filters or video games and are allowed to be used with little requirements other than transparency obligations. Systems deemed to pose an unacceptable risk include government social scoring and real-time biometric identification systems in public places. These are prohibited with little exception. High risk systems are permitted, but developers and users must adhere to regulations, that require rigorous testing, proper documentation of data quality an accountability framework that details human oversight. AI systems within the education and vocational training landscape are considered high risk. It will be interesting to see how this will shape the future of AI in these sectors, of particular interest the high-risk environment that education and vocational training finds itself in and the use of general-purpose AI systems within the field.

AI in Education

Global policy guidance which specifically relates to the use of AI in educational settings is continually evolving and is contingent on the broader landscape of policy and regulation development in AI. An overview of the contents of some key documents is provided below.

The European Commission (2022). ***Ethical guidelines on the use of artificial intelligence and data in teaching and learning for educators*** **>**

- Provides the context for the guidelines within the Digital Education Action Plan, artificial intelligence and data use and EU policy on artificial intelligence.
- Gives examples of AI and data use in education with supporting ethical considerations.
- Guidance for educators and school leaders for planning for the effective use of AI and data in schools.
- Support for educators and school leaders in raising awareness and community engagement and how to develop competences for the ethical use of AI and data.

UNESCO, (2021). ***AI and education: guidance for policy-makers*****. UNESCO >**

- The potential of AI in facilitating new approaches to learning and assessment, including the use of intelligence tutoring systems, educational virtual and augmented reality and AI-enabled collaborative learning is highlighted.
- The potential role that AI could play in achieving more efficient educational management and delivery is discussed.
- The report spotlights several challenges and risks, such as the ethical and legal issues relating to educational data and algorithms and the potential role of teachers in an AI dominated world.

UNESCO. (2023). ***Guidance for generative AI in education and research*****. UNESCO >**

- This global guidance on Gen AI aims to support countries to plan both immediate actions and long-term policy development in education.
- A core message is that AI requires regulation, including both international and national data protection regulations.
- A human-centred approach is identified as fundamental to the successful and safe use of Gen AI in education, whereby both educators and students must be equipped with the skills to effectively manage and use Gen AI for the purposes of high-quality teaching, learning and assessment.

- From the perspective of a human-centred approach, AI tools should be designed to extend or augment human intellectual abilities and social skills, and not undermine them, conflict with them or usurp them.

The **European Digital Education Hub team 'AI in Education' >** was founded in February 2023 to respond to AI developments and consequent implications for education. Seven information reports which directly relate to AI and it's use in teaching and learning have been published thus far:

- **Teachers' competences >** + **infographic >**
- **How to support teachers in using AI in teaching >**
- **Usage scenarios and practical examples of using AI in education >**
- **Education about AI >**
- **Influence of AI on educational governance >**
- **AI and ethics, human rights, law, education data >**
- **Teaching with AI: assessment, feedback and personalisation >**

With the emergence of the EU's AI Act and the publication of ethical guidelines at a European level, as well as guidelines for policy makers and users of AI in Education, the next section considers the actions taken at a national level in participating countries.

Section Two:
National policy on Artificial Intelligence and education

This section synthesises data from across the participating countries to identify advancements in national policies and laws occurring in response to Artificial Intelligence. It also considers developments specific to the use of AI in Education. While developments in AI, and in the use of AI in Education have accelerated of late, many of the participating CIDREE Network countries have already taken steps to prepare for the more widespread use of AI among government employees and in workforces in general. Here we provide an overview of approaches taken but more detail pertaining to individual countries can be accessed in **Appendix Two >**.

National laws/policies/guidelines on AI

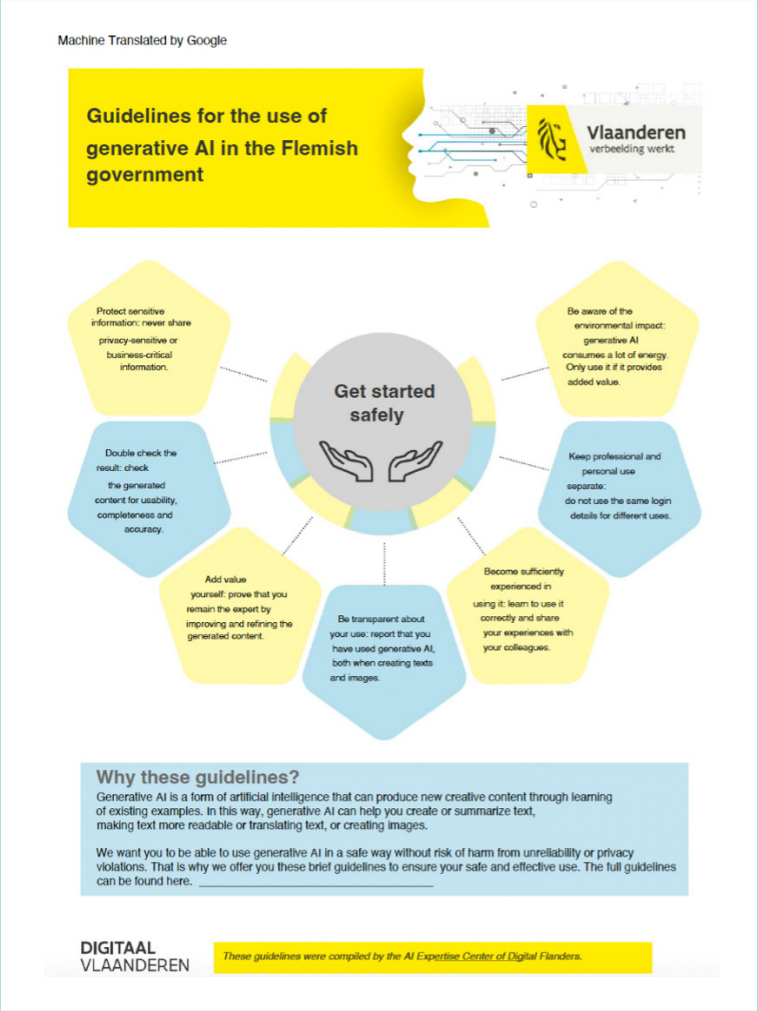
Slovenia has over 40 years of active involvement in the development of AI, and the Slovenian government have developed, and adopted, a national program for the development of AI which, it suggests, provides a basis for system wide support. The national program is consistent with OECD principles on AI and promotes AI which is trustworthy, and which respects human rights and democratic values. A new International Research Centre on Artificial Intelligence under the auspices of UNESCO, based in Ljubljana has also been established. The aim of establishing the Centre for Artificial Intelligence is to stimulate research, technology development and innovation in this field at the international level.

The **Flemish** government identifies 6 guiding principles for the use of AI by employees for the Flemish Government in its AI strategy which are summarised in the following statement:

> *AI within governments in Flanders is democratic, reliable, people-oriented and sustainable, with correct use and management of data and applied with expert knowledge.*

Governments in **Ireland**, **Luxembourg** and **Scotland** have also developed national strategies on AI with some strategies, such as the Scottish strategy, emerging from a consultation process with academia, industry and the public. These strategies all reference the need to consider societal benefits of, and a human-centred approach to AI, as well as the need to develop public trust through transparency and education. Education is not limited to formal education with the Flemish government developing public guides to the use of AI, as can be seen in this infographic, translated from the original available **at this link >**.

An Infographic on the responsible use of AI for the general public (**Belgium (Flanders)**)



A Digital **Switzerland** Strategy was developed in 2018 which has AI as a core theme. This was followed by the publication of a set of guidelines for the use of AI in the federal administration. The guidelines should provide a general frame of reference for federal agencies and external partners entrusted with governmental tasks and must be adhered to in the following specific contexts:

- When developing sectoral AI strategies;
- When introducing or adapting specific, sectoral regulations;
- When developing and using AI systems within the Federal Administration;
- When helping to shape the international regulatory framework on AI.

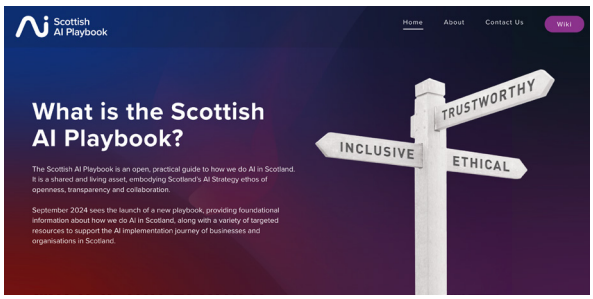
While participating countries all express a desire to lead internationally in the use and development of AI, none has yet taken steps to regulate its development and use through law. The Dutch government, in identifying a vision for AI, does propose the necessity for appropriate legislation and regulation. This is detailed as one of 6 action points which it deems necessary for development of responsible generative AI in **The Netherlands**, which, it is suggested, will allow for appropriate control to be maintained over the impact of the technology. In **Slovenia**, it is suggested that the National Program for AI provides a framework which will inform future regulation. Please see **Appendix two, Table 1 >**, for more detail.

National laws/policies/guidelines on AI in Education

All of the participating countries recognise in their strategies and programs the necessity for education about AI and in the use of AI, and many have already moved to include the digital competencies necessary for the use of AI into their school curricula. These curriculum responses will be discussed in more detail in section three.

Where national curricula exist, national strategies generally apply. This is the case in **Ireland**, with one strand of the national strategy for AI (**AI-Here for Good: National Artificial Intelligence Strategy for Ireland >**) focused on education. This strand is primarily focussed on the need to develop a workforce capable of interacting with AI technology. It considers the role of Higher Education Authorities and further learning providers in the development of this workforce. However, it also identifies some of the potential limitations and risk in the use of AI to augment teaching and learning at all levels of the education system. This strategy, as well as strategies in other countries, recognise the need to develop general digital literacy skills and transversal skills such as critical thinking and problem solving, to support engagement with AI.

The **Scottish AI Strategy >** commits to openness, transparency and collaboration. Some of these values are evidenced in the establishment of 'The Scottish AI playbook' which is described as 'an open and practical guide to how we do AI in **Scotland**'. Embodying the principle of inclusion, contributions are invited from across sectors, including education, and it is a repository of relevant information for all engaging with the development or use of AI. Information about the first version can be accessed **http://www.scottishaiplaybook.com/ >**.



In **Luxembourg** a National Media Competency Framework – the 'Medienkompass' – offers a comprehensive guide aimed at integrating media competence, including data and AI literacy, into educational settings. It defines AI and data literacy, and outlines specific competencies across different educational levels, offering practical examples and suggesting ways to implement these skills in the classroom.

While many of the guidelines developed in participating countries refer to an ethical use of AI, the creation of a **vision paper >** in **Flanders**, entitled 'Responsible AI in Flemish education – a collaborative process from development to use', is identified as the first step in the process of creating a Flemish policy on Responsible AI in Education. The vision paper provides a framework for responsible development of, as well as use of, AI in educational settings and identifies application developers, school boards, teachers and students as having responsibility.

In **Switzerland**, where the education systems are regulated by the 26 cantons, the **federal government guidelines for the use of AI >**, do not apply across primary and post-primary settings. Each canton, is however, responsible for developing their own guidelines, such as the non-binding guidelines issued by the canton of Zurich which can be accessed in English and German **at this link >**. Such guidelines can then be a support in implementing best practice.

In **Sweden** also, because of the decentralisation of the education system, national law or policy on AI in education does not exist, but the National Agency for Education encourages schools to have a common approach towards AI, taking local conditions into consideration. The National Agency for Education also encourages schools to view AI as a part of the digital competence described in existing curricula.

It is apparent then that there has been a response to developments in AI in Education at a national level where the education system is regulated nationally, and these are aligned to responses to AI more generally. Where education systems are decentralised, there is also an awareness of the necessity for a co-ordinated response. Additional details on the process adopted in each country through national policy on AI in education can be found in **Appendix Two, Table 1 >**, where links to national documents provided by contributors are also outlined. While national responses have primarily been in the form of guidelines for users of AI, there have also been considerable developments in curricula to support the development of skills and competencies as part of the education systems which will support engagement with AI. These developments are discussed in the next section.

Section Three:
Curriculum developments that support effective engagement with Artificial Intelligence

Due to the complex nature of Artificial Intelligence, member organisations are responding with both broad and specific approaches to curriculum development. Member organisations specific responses to AI and curriculum development will be discussed in Section Four. Many countries have moved to evolve their curricula, at both primary and post-primary level, to facilitate the development of digital and transversal skills which support effective engagement with AI. This section outlines these broad responses.

Development of digital skills

Through the development of digital literacy skills students become critical users of digital tools and media, which might support them as they engage with AI. In some countries this has involved the introduction of new subjects. In others, such as **Ireland** and **Luxembourg**, there is a curricular emphasis on the development of digital knowledge and skills through learning across all subjects, while students are also provided with an option of further developing these skills in specific digital related subjects.

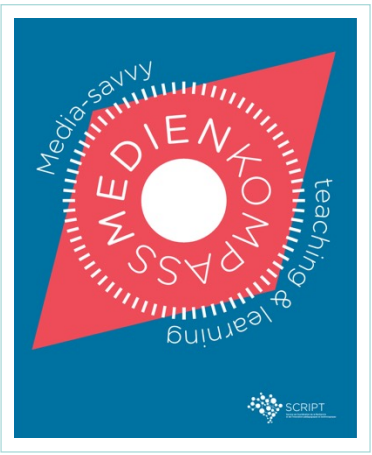
Ireland is implementing a **Digital Strategy for Schools to 2027 >** which is designed to support the school system to ensure that all learners will have an opportunity to gain the knowledge and skills they need to successfully navigate an ever evolving digital word. The Digital Strategy for Schools to 2027 is supported by the Digital Learning Framework for Primary and **Post-Primary schools >**, which has been developed to assist schools in effectively embedding digital technologies into teaching and learning. **Digital Learning Planning >** provides a range of resources to support schools and teachers. The Digital Strategy for Schools to 2027 complements and supports **Ireland's Literacy, Numeracy and Digital Literacy Strategy 2024-2033: Every Learner from Birth to Young Adulthood >**, which was published in 2024.

Some resources which support schools and teachers in **Ireland**

At primary level, the **Primary Curriculum Framework >** (NCCA, 2023) underpins high-quality learning, teaching, and assessment for all children attending primary and special schools in **Ireland**. 'Being a digital learner' is one of the key competencies that is embedded across all curriculum areas. In the area of **Wellbeing >**, for example, children develop digital safety skills for appropriate and responsible use of digital technologies. They are also supported to learn how to identify credible sources of information and develop an awareness of the persuasive role of digital media.

The **Primary Language Curriculum >** also recognizes the importance of developing digital literacy. In the curriculum, 'text' refers to all products of language use including electronic and digital. Children have opportunities to locate, select and critically analyse relevant information in multiple modes including text, visual and audio. Through the Learning Outcomes (which describe expected learning for learners at the end of a two-year stage), children develop knowledge, skills and dispositions that equip them with the ability to be digitally literate.

In the curricular area of **Science, Technology and Engineering Education >**, children develop an awareness of how different technologies operate and explore the advantages and potential disadvantages of common digital devices. They develop an understanding of algorithms and have opportunities to create and refine algorithms using both digital and non-digital contexts. As they move towards the senior end of primary school, they have opportunities to critically reflect on the role that data plays in their lives, helping to prepare them for the latest technological advancements.



In **Luxembourg** the National Digital Competence Framework has been reworked into the 'Medienkompass' (Media Compass) to take account of developments in AI and data management. It details five competence areas: information and data, communication and collaboration, creating content, data protection and security, and digital world. Each have a number of associated competencies which are developed across and through engagement in all subjects.

Coding, computational thinking and problem-solving are skills that are promoted in primary schools since 2020/21. Pupils learn to understand how digital devices think and practise setting up instructions for digital devices, i.e. algorithms, themselves. Coding and computational thinking are integrated into the mathematics courses in upper primary education, and are taught transversally in the lower grades. Digital Sciences has been introduced as a subject area in lower secondary in addition to an emphasis on introducing and using digital media in other subjects.

In **The Netherlands**, digital literacy will be included in the national targets for primary and secondary education. The new targets should provide concrete guidelines for schools and teachers on how to integrate digital literacy into education.

Belgium (Flanders) is investing heavily in digital education, following on from the corona crisis, supporting schools and teachers through the establishment of the **Digisprong Knowledge Center >** which offers workshops, guidelines and articles around 11 IT-linked themes. Fostering digital competence is also an integral part of the **Swedish** education system. Digital competence for pupils in this context is described as:

- Being able to use and understand digital tools and media
- Having a critical and responsible approach
- Understanding the societal impact of digital transformation
- Being able to solve problems and turn ideas into action

As **Switzerland** is a federal state, rarely are there nation-wide initiatives for the development of digital competencies for compulsory or upper-secondary education. The federal state does however run an action plan that provides an overview of the measures being taken to implement the digital strategy. The Swiss Conference of Cantonal Ministers of Education also provides an overview on their projects with respect to digitalisation.

As part of a curriculum reform project in **Slovenia**, digital competencies are to be included in the mandatory curriculum of the education system. This curriculum reform project has seen the development of a web application that enables the creation and writing of revised curricula in accordance with the requirements of the Guidelines for Curriculum Reform in Primary and Secondary Schools, and Vocational Education. Interestingly, the AI wizard assists authors with tasks such as writing objectives, and once the application is publicly available, it is envisaged that the AI wizard will also provide support to teachers in lesson preparation. A powerful search engine will enable targeted lesson preparation tailored to the needs of the students. The AI wizard represents an advanced AI solution for optimizing educational processes and it is suggested that the experience gained from its development will be valuable for further research and use of generating AI (genAI) in education.

In **Scotland**, digital knowledge and skills are applied across all subjects so that students develop digital competencies in multiple contexts. Support is provided to teachers with curriculum planning through the DigiLearn website: **https://blogs.glowscotland.org.uk/glowblogs/digilearn/2024/03/03/what-digital-learning-might-look-like/ >**. Teachers can also find support to develop their own digital skills here too.

As in **Scotland**, where countries have moved to include digital skills across the curricula, there is a necessity to consider teacher readiness and ability to use such pedagogies and to teach such skills. The Data Literacy in Upper Primary (DALI4US) Erasmus+ project is being developed by **Luxembourg**, **Slovenia** and **Ireland**. It aims to equip primary school teachers with the confidence, knowledge, skills and attitudes needed to teach data literacy effectively. By providing them with appropriate technological and pedagogical resources, as well as professional training, it aims to raise teachers' awareness, enhance their teaching skills and provide them with a digital ecosystem that is perfectly tailored to their requirements and needs: **https://www.dali4us.eu/ >**

Development of Transversal skills

Transversal skills, such as problem solving and critical thinking, have relevance in supporting students to engage with AI. In 2018, transversal skills were the subject of research by the state secretariat on education in **Switzerland**. The research indicated that transversal competencies will increasingly be required, in view of labour market-relevant megatrends. Consequently it was suggested that these competencies should be anchored as clearly formulated educational objectives. Transversal competencies and skills relevant to AI are already present in the **Swedish** curriculum. Among some of them are the ethical perspectives, sustainability, critical thinking and creativity. Source criticism and source awareness are also mentioned in the curriculum and several subject syllabi. A critical approach to, and responsible use of, digital tools is promoted and pupils are encouraged to think about the interaction between technology and society.

Slovenian educators, through their involvement in the **ATS STEM project** (Assessment of Transversal Skills in STEM), have been actively engaged in fostering transversal competencies relevant to AI in education. More information is provided in the **country's final pilot report >**.

In **Belgium (Flanders)**, the following transversal competencies are currently included in the compulsory curriculum, with the parent key competence in parentheses.

Primary education

- Problem-solving (*learning competence*)
- executing a creative process (*spirit of*)

Secondary education:

- using (meta)cognitive learning and regulation strategies to master learning content. (*learning competence*)
- purposefully searching for information in various sources and process it in a critical and systematic way. (*learning competence*)
- generating creative ideas to solve a problem and discuss their feasibility using criteria (*entrepreneurship*)
- engaging in an informed, reasoned and constructive dialogue about social themes. (*citizenship*)

A revision of the national core objectives and attainment targets in **The Netherlands** gave rise to a new categorisation of transversal skills and domain-general reasoning skills. There is reference to basic skills (literacy, numeracy, digital literacy and citizenship), thinking skills (analytical, critical and creative thinking), learning skills (social interaction, cooperation, learning skills), and compound skills (research, design, orientation on own professional life). Under the revision, digital literacy is positioned both as a basic skill and in connection with the other skills.

In **Ireland**, at post primary level, the Framework for Junior Cycle supports the incremental development of digital skills through the eight **key skills >**, which includes managing information and thinking, where students search for and evaluate content in different digital formats online. Redevelopment of senior cycle is in progress in **Ireland**, and a set of seven **key competencies >** underpin the redevelopment. Literacies (including digital literacy) weave across all seven competencies. It is suggested that students' literacies are well developed when they can meaningfully and effectively read, watch, write, speak, listen, interpret and mediate meaning in a range of contexts and can make good use of various tools, including technologies, to support their learning. Some key competencies are more relevant to AI in education, such as the key competency of thinking and solving problems, which encourages students to respond critically to questions and tasks to solve problems, focusing on acting with integrity and being transparent about sources. Students nurture their creativity when they are curious, open-minded and are comfortable with ambiguity and uncertainty, while finding ways to move forward, as described in the key competency of creativity and within the key competency of communicating, students analyse and interpret a range of texts, developing critical understanding and recognising and trying to counteract misinformation. Students are also encouraged to act ethically within the key competency of participating in society. As students engage with a variety of subjects and modules across senior cycle, they develop and embed key competencies that can be applied within a broad range of contexts including when they engage with AI.

An optional short course in **Digital Media Literacy >** is offered in Junior Cycle, which aims to extend and refine students' ability to use digital technology, communication tools and the internet creatively and safely. This short course includes four strands: (1) my digital world; (2) following my interests online; (3) checking the facts and (4) publishing myself. It has been recently reviewed.

At primary level, the **Primary Curriculum Framework >** (NCCA, 2023) supports the development of knowledge, skills and dispositions which enable children to adapt to a wide range of contexts in today's world. These capabilities are presented as seven inextricably linked key competencies which are embedded across all curriculum areas and stages of primary school. Although each key competency could relate to AI in education in some way, the competency of 'being a digital learner' is particularly significant. Through this competency, it is envisaged that children can become responsible and respectful users and creators in technology, thus enabling them to critically engage and contribute to a digitally connected and interdependent world.

A considerable evolution of curricula has occurred across member organisations, promoting the development of skills many of which are necessary for effective engagement with AI. In the next section an overview of curriculum developments that are an explicit response to AI are discussed.

Section Four:
Curriculum responses specific to Artificial Intelligence

This section considers specific curriculum responses to Artificial Intelligence in education and discusses emerging guidelines and curriculum developments across member organisations involved in this project. Some of the varied approaches to professional learning are detailed. Additionally, emerging guidelines on the use of AI for assessment are presented.

Curriculum responses specific to Artificial Intelligence

In response to advances in AI, **Luxembourg** has revised its National Digital Competency Framework. The "Medienkompass" is a guide to integrating media competence, including data and AI literacy, into educational settings. It defines AI and data literacy, and emphasises the need for critical evaluation, effective communication, and responsible use of AI technologies. In addition, a new course at lower secondary, Digital Sciences, includes AI as one of its 6 thematic axes. While this course was piloted in 18 schools, commencing in 2021, it is to be offered in all schools by 2025. This is part of the 'Innovation Initiatives, Digital **Luxembourg**' which is a multidisciplinary collaborative government initiative which has as its goal a positive transformation to digitisation.

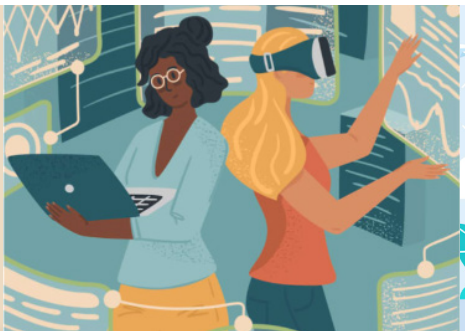
In **Belgium (Flanders)**, the previously mentioned **Digisprong Knowledge Center >** hosts articles on 11 IT linked themes and includes **Artificial Intelligence >** as one of these. Some of the relevant articles available can be reached through these links.

A sample of articles available from the Digisprong Knowledge centre (**Belgium (Flanders)**)

AI in education, why are ethical guidelines needed >

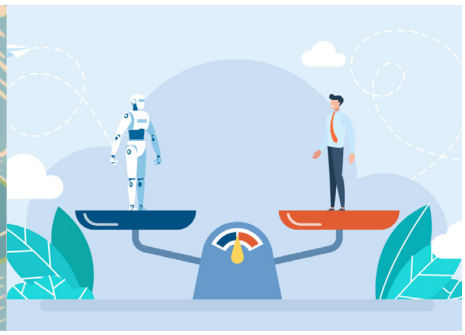
This is one of a series of articles being developed on each chapter of **European Commission's ethical guidelines for the use of AI in education >**.

AI in education, addedvalue or not? >



What can AI do? What is the impact on your education? How can you ensure that AI strengthens rather than impoverishes your lessons?

Specific questions to evaluate, choose and use AI programs >

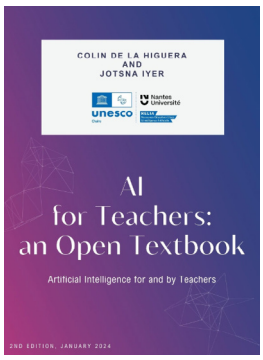


We show you how to use a few guiding questions to determine whether the AI programmes meet the 7 key conditions.

In **Ireland**, **Computer Science >** is now offered as an optional subject in senior cycle having been first introduced in 2018 with a pilot phase. As part of this students learn about AI, machine learning and when AI algorithms might be used in certain contexts. They also become skilled in using and developing algorithms. Another aspect explored in the subject is the social and ethical considerations of computing technologies. **Optional modules in AI >** are available to students of Transition Year through different education institutions such as Dublin City University. **Ireland**'s curriculum body, The National Council for Curriculum and Assessment (NCCA), is also engaged in designing modules in AI for Transition Year students.

AI will be offered as an optional subject in **Sweden** at the Upper Secondary level commencing in the 2024-2025 school year. An AI subject for Upper Secondary school was already in development before the most recent wave of AI interest. However, it will now commence one year earlier than initially planned to meet demands from stakeholders. The subject contains two perspectives, a technical perspective and a societal perspective. It is also adaptable to the local programme of the pupils.

AI learning has three focal areas in **Scotland**, namely learning about AI, learning with AI and creating AI. Learning with AI impacts how curriculum is enacted. Two Learning Authorities, Midlotian and Scottish Borders, are already utilising language processing tools to develop reading and writing skills, with the outcomes soon to be evaluated. This is one of the many action research projects being undertaken in **Scotland** involving the use of AI tools.



Part of the national Response to AI in **Slovenia** has seen teachers, educators and universities participate in a number of research projects to support the use of AI in Education and includes the **AI4T project – AI for teachers >**. **Ireland** and **Luxembourg** are also partners in this project. This project has, as one of its outputs, an open textbook for teachers. This provides for self-directed learning for teachers in the area of AI and is written for teachers by teachers. An overview of the professional learning opportunities for teachers across the responding countries is now provided in the next section.

Professional learning opportunities in Artificial Intelligence

The contributing countries have been very active in providing opportunities for professional learning on AI in education to teachers and educators, but also to the general public e.g. in the form of awareness raising webinars available in **Sweden**. Some of the ideas for professional learning are detailed here and in the infographic below and links are provided where relevant.

Professional Learning Opportunities

Type	Name and/or link	Description	Country
Dedicated digital platform	**Digisprong knowledge centre >**	To support school leaders, teachers and ICt co-ordinators with education technology	**Belgium Flanders** 
	digilearnscot >	Education Scotland digital education support site	**Scotland** 
Digital sharing spaces	**Klascement >**	Teachers share teaching materials and ideas	**Belgium** 
	Scottish AI Playbook >	Sharing space for collaboration for all involved with AI	**Scotland** 
Self directed learning spaces	**Teacher training – AI4T project >**	MOOC – product of an Erasmus+project	**Luxembourg Slovenia Ireland** 
	https://skupnost.sio.si/course/view.php?id=11138 >	Moodle course	**Slovenia** 
	AI4T project resources >	A collection of resources on AI for teachers	**Luxembourg Slovenia Ireland** 
Online lesson resources	**Dwengo >**	Supporting teachers in the use of robotics and AI	**International** 
CPD offerings	Webinars e.g **AI in Education Innovations, Opportunities and Ethical Perspectives >** **Impact connecting >**		**Ireland Belgium** 
Other learning ideas	**AI in schools week >** Research projects e.g • **PUMICE >** • **AI4T >**	A series of events to highlight AI use	**Scotland** 
University courses and qualifications			**Luxembourg Switzerland** 

Scotland and **Belgium (Flanders)** have developed a dedicated online hub or space to host general information, provide access to research articles, and also to provide access to webinars and online courses where teachers and educators can engage in self-directed learning about all aspects of digitisation, including AI. In **The Netherlands**, the website of the centre for curriculum development (SLO) has a section dedicated to digital literacy and provides information and articles based on research to support teachers and schools.

Providing opportunities for teachers to share and collaborate also supports professional learning. **Klascement >** (**Belgium (Flanders)**) is a digital sharing space for teachers where teachers can share and access classroom resources and the **Scottish AI playbook >** provides opportunity for all involved in AI (not just educators) to share and collaborate. **Luxembourg** has established AI specific support groups for teachers and Digital Teach Meets have taken place in **Scotland**. Here also professional learning has been supported through schools sharing their stories with other practitioners so that schools learn from each other. This happens through online and in-person events.

Teacher learning has been facilitated through Moodle courses in **Slovenia**, and via MOOC as part of the **AI4T project >** in which **Luxembourg**, **Slovenia** and **Ireland** partner. The introduction of new courses in AI in upper secondary schooling in **Sweden** has led to Universities offering further qualification courses for teachers. In **Switzerland**, also at tertiary level, over 30 courses are offered related to AI. Initial teacher education at University is also undergoing reform in **Luxembourg** to include consideration of AI.

Workshops, both digital and in-person, are also provided. In **Ireland**, OIDE is the national support service for teachers and school leaders, and offers a variety of opportunities including webinars such as **AI in Education Innovations, Opportunities and Ethical Perspectives >** and various in-person training events such as 'An Introduction to AI for Post-primary Teachers' and 'AI in the Classroom: AI and Canva'. In **Scotland**, in-person and online workshops are offered throughout the year as well as during the **Scottish AI in Schools week >** which took place in March 2024, and included curriculum related sessions as well as opportunities for sharing professional learning and sessions on genAI. **FraAIdee** was a professional learning opportunity in **Flanders** which took place across 22 Fridays, offering 66 snacks about 'Education with AI' at lunchtime. Some examples of topics of webinars offered were: 'AI teaching-tools', 'AI policy', 'AI and ethics', 'AI and didactics', 'Learning to prompt generative AI'.

Practical supports, including lesson ideas and the provision of curriculum planning tools, also support learning for teachers and school leaders. **Dwengo >** is a not for profit organisation which started in **Belgium** but now supports teachers internationally, with the provision of online manuals and supports, as well as opportunities to attend in-person workshops specifically in the areas of robotics and AI.

Finally in **Belgium** **Impact connecting >** organizes an ICT practical day or conference event. This is a major **ICT Education** event that has been organised more than 35 times since 2002. Since 2019, it has been attended annually with more than 1000 attendees from primary, secondary, adult and higher education.

Assessment and Artificial Intelligence

Recent developments in Generative AI (genAI) in particular, have seen some third level institutions in participating countries issue guidelines on assessment practices. These include advice on being open and transparent with students about when genAI may or may not be used as seen in these **guidelines >** issued by the University of Leuven in **Belgium** for example.

In **Ireland**, the State Examination Commission (SEC) is responsible for the development, assessment, accreditation and certification of the post-primary examinations, the Junior Certificate and Leaving Certificate. Current guidance from the SEC issued to students advise that material generated by AI in coursework may result in students losing their marks, as it will be treated in the same way as any other material not generated by the student. Including AI generated material without quoting it as the work of an AI system will be considered plagiarism. However, even if the AI generated material is referenced appropriately, credit can only be awarded for the effective use of the material in the support or development of the student's own work. In September 2023, The Minster for Education announced a move away from planned teacher-based assessments within Senior Cycle redevelopment, citing the influence of AI as a deciding factor. The Minister has also asked the SEC to research the challenges and opportunities posed by AI when assessing students for these exams and additional assessment components.

In **Sweden**, caution has also been urged and since early spring 2023, the National Agency for Education recommends against having home assignments used for grading if it cannot be ensured that pupils have completed the assignment themselves. Assessment is now, to a larger extent, carried out continuously in class, orally and in writing, using pen and paper or on digital devices with the appropriate restrictions in place, such as limited access to internet. However, recognising some of the learning benefits provided for by AI, the emphasis in some assessments in **Sweden** have been changed to respond to recent developments. For example, for the oral part in the National test in Swedish at Upper Secondary level, a speech can be prepared at home. Knowing that AI can be used to some extent in these preparations, more emphasis has been put on assessment of the delivery of the speech. Teachers may also ask questions to follow up on the content of the speech. In this way the use of AI is to contribute to learning but the focus of the assessment has changed.

Many contributing countries, including **The Netherlands**, suggest that there will be changes to assessment approaches in response to developments in AI. The **Slovenian** Ministry for Education has recently published a public tender for the development of a research project to consider how genAI might be integrated into educational processes and it is to be assumed that the role and/or impact of genAI in assessment processes may form part of this.

In **Scotland**, the potential of AI in changing assessment practice is also being explored. An AI tool which can be used to automate the grading process, saving time for educators and supporting teacher judgement as part of moderation, is to be trialled in 7 establishments. The Norwegian developed 'Learnlab' tool can also provide detailed feedback to students, helping them understand their mistakes and improve. A small group of teachers in Dundee are working to explore AI tools to enhance teaching, learning and assessment by exploring tools which assist with the creation of content for lesson plans, presentations and quizzes. The use of 'My GlobalBridge' in Dundee will be monitored. This platform allows evidencing of learning for formative assessment purposes and suggests content of interest because of what is shared on the platform.

While the initial response to developments within AI was one of caution, many countries are now looking to research how AI might enhance teaching, learning and assessment. A working group on AI and data in education at the Swedish National Agency for Education consisting of members across departments and units was convened in Spring 2023. The working group is actively monitoring developments in the field of AI and data in education, coordinating the work at the agency and supporting schools in their exploration of AI. The Swedish National Agency for Education is actively investigating and assessing the long-term effects (5–10 years) that AI developments may have on education.

A considerable response to AI within curricula development has assisted all members of the various education systems to continue to engage with AI, while also recognising the need for further collaboration so that its use empowers learners and educators. This audit is the first step in a larger project that supports the CIDREE network in their continued response to AI within education.

Appendix One: Education System Overview and Funding structures

Colour Code Key: | **Education System description** | **Primary Curricula** | **Post-primary Curricula** | **Funding** | **AI Models**

Table 1: Belgium (Flanders) and Ireland

	BELGIUM (FLANDERS)	IRELAND
Structure of Education System	Elementary education comprises both early childhood education and primary education. Early Childhood education is accessible for children from two and a half to six years old. Although it is not obligatory for children up until 5 years old, almost all children participate in early childhood education. Early Childhood education supports the versatile formation of children and stimulates their cognitive, language, motor and affective development. Primary education is targeted at children from six to twelve years old and comprises six subsequent school years. Students aged 12 to 14 attend the first stage of secondary education. The first stage prepares students for study choices in the second stage. In general sstudents with a certificate of primary education start in the 1st year A, students without a certificate have to start in the 1st year B. In the second and third stage of secondary education students choose an education programme. Each educational programme belongs to a domain and an orientation. There rae eight domains or areas of interest. (STEM, Arts...)and 3 orientations: orientation to higher education (linked to a domain or not), vocational orientation or a combination of both. Each domain encompasses a wide range of education programmes in the three different orientations. **Matrix secondary education Flanders >** More information on **https://vlaamsekwalificatiestructuur.be/links-en-publicaties/koppelingsrapport-vks-eqf/files/Koppelingsrapport_BENL 2023-UPDATE.pdf >** (page 24-31)	Education is compulsory for children in Ireland from the ages of 6 to 16 or until students have completed three years of post-primary education. The Irish education system incorporates primary school and post-primary school. Primary education consists of an 8-year cycle: junior infants, senior infants, and first to sixth classes. In Ireland all children are entitled to free primary education. Post-primary education caters for students generally in the 12–18 age group. A three-year junior cycle culminates in the awarding of the **Junior Cycle Profile of Achievement >** (JCPA). Students can then enter **Transition Year >**, an optional year long programme that supports students as they transition to senior cycle or move directly into the **Leaving Certificate Established >** with progression pathways predominantly focused on Higher Education. Students on the LCE programme can choose to take an optional vocational programme known as the **Leaving Certificate Vocational Programme >**. Alternatively students may choose the **Leaving Certificate Applied >** programme, with progression routes predominantly in Further Education and Training. may choose the **Leaving Certificate Applied >**.

	BELGIUM (FLANDERS)	IRELAND
Primary Curriculum and Digital Technologies and AI	In Belgium there are three regions: Flanders, Wallonia and the German-speaking part. Education is the jurisdiction of the **regions**. We talk here about the curriculum of **Flanders**. The learning objectives of the basic curriculum are linked to 16 key competences These competences are clusters of related skills and knowledge that students must acquire for their personal development. The 16 clusters of key competences are foreign languages, citizenship, cultural awareness, digital competences, sustainability, financial-economic competences, historical awareness, judicial competences, learning competences, physical and psychological health, Dutch, spirit of enterprise, environmental awareness, socio-relational competences, STEM, self-awareness. The key competences have been established after a societal debate on the question what schools should teach the next generation. They are also based on the European key competences that offer a frame of reference for European policy on lifelong learning and participation in our rapidly changing society. One of the key competencies are digital competencies. The focus for digital competencies in the new curriculum emphasises: • Using digital skills • Making appropriate choices to express messages digitally • Illustrating the influences of media use Computational thinking is integrated in the learning goals of mathematics: solving a problem using decomposition, pattern recognition, abstraction and algorithms. Additionally there is now a formal curriculum for early childhood education aimed at developing digital skills. **There is no explicit reference to AI in the primary curriculum**	The **national** curriculum is presented in seven areas, some of which are further subdivided into subjects. These include Primary Language, Arts Education, Mathematics, Social Environmental and Scientific Education, Physical Education, Religious Education and Social, Personal and Health Education. The primary curriculum is currently in the process of redevelopment and changes are being made to the way the curriculum is structured and presented. The ***Primary Curriculum Framework >*** was published in early 2023 and forms the basis for high-quality learning, teaching and assessment for all children attending primary and special schools. Currently, there is no explicit reference to AI in the primary curriculum. In the redeveloped ***Primary Curriculum Framework >***, seven key competencies, which are embedded across all curricular areas, outline the broad capabilities which children will develop across each stage of primary education. One key competency is 'being a digital learner'. This competency aims to support children's ability to collaborate and thrive in a world which is increasingly immersed in technology. For the first time in primary education in Ireland, Technology is also explicitly introduced within the broader area of Science, Technology and Engineering Education with a focus on children using and creating with technology. Children learn about different aspects of technology across other curricular areas, for example digital safety skills in Wellbeing. **Currently there is no explicit reference to AI in the primary curriculum.**

	BELGIUM (FLANDERS)	IRELAND
Post-Primary Curriculum and Digital Technologies and AI	As in primary education the curriculum of secondary education is based on 16 key competencies (see above). The basic curriculum in the first grade supports the acquisition of a number of educational objectives: • Basic literacy: these are minimal requirements for basic competences such as mathematics and digital literacy and Dutch. They have to be obtained by every student individually. • Minimum goals: these goals need to be obtained by most students by the end of the stage. • Additional goals for Dutch: these are educational objectives with a higher level of abstraction, or a higher level of complexity, and must be obtained by as many students as possible. In the second and third stage of secondary education, there are also learning objectives for the basic curriculum, based on the 16 key competences. Additional there are specific learning objectives for each education programme. **Learning objectives for secondary education Flanders >** Digital competence and media literacy encompasses the familiarity with, engagement with, and critical and responsible use of digital technologies to learn, work and participate in civic life. **First stage (age 12–14):** This key competency focuses in the first stage on the use of basic functionalities of applications to communicate digitally, create content and manage content, on respecting ethical, social and legal rules in the use of digital technology and on designing a digital and non-digital algorithm according to the principles of computational thinking and on debugging that algorithm. **Second stage (age 14–16):** In the second stage there is a focus on the use of current functionalities of similar applications to communicate digitally, create content and manage content; respect for ethical, social and legal rules when using digital content; on the analysis of the impact of digital systems on society from the perspective of principles of computational thinking. **Third stage (age 16-18)** In the third stage, further efforts are made to use current functionalities of similar applications to create digital content and to respect ethical, social and legal rules when using digital technology. **There is no explicit reference to AI in the secondary curriculum**	There is a **national curriculum** for both junior and senior cycle. The ***Junior Cycle Framework*** > provides the overall structure to junior cycle, which is composed of subjects, short courses and other learning experiences, in addition to a **Level 1/ Level 2 Learning Programme** > for students with global development delay. Schools have autonomy to design and plan their approach to a curriculum that suits their school context and students best, through the framework. The **Transition Year Programme Statement** > provides overall guidance and support for schools to design a Transition Year, that meets the needs of their learners. **Senior cycle** > redevelopment commenced in 2022. Currently subjects specifications and programme statements support schools in their approach to providing a senior cycle curriculum. Redevelopment initially is focusing on the redevelopment of subjects and modules, with further work planned on flexible and diverse pathways through senior cycle. Within all subjects and modules across all programmes in junior and senior cycle, there is a focus on the development of digital skills through teaching, learning and assessment practices, underpinned by the **Digital Strategy for Schools** >. Short courses on **Coding** > and **Digital Media Literacy** > are available in junior cycle, while **Computer Science** > is available as a subject in senior cycle. **Currently, there is no explicit reference to AI in the post-primary curriculum.**

	BELGIUM (FLANDERS)	IRELAND
Funding to support Digital Technologies and access to devices for students	Flanders has seized the opportunity of the corona crisis to invest a historic amount of 375 million euros in a major digital leap for all schools, pupils and teachers as part of the 'Flemish Resilience' recovery plan. This extra budget was allocated for certain purposes and spread over two schoolyears : • Strengthening the ICT infrastructure within the school walls; • Shared-use devices (for early childhood education and 1-4 year of primary education); • An ICT device for every student in the 5th and 6th year of primary education; • An ICT device for every secondary education student. The "Digisprong programme" has contributed to an accelerated digitisation of Flemish education. The programme led to an increase in ICT infrastructure in Flemish education, which also improved access to digital education for pupils and teachers. Digisprong's primary objectives are organized into four categories: • a future-oriented and secure ICT infrastructure for all schools of compulsory education; • a strongly supportive and effective ICT school policy; • ICT-competent teachers and teacher trainers and adapted digital learning resources; • a knowledge and advice centre 'Digisprong' serving the educational field. The Digisprong-funding has contributed to an accelerated digitisation of Flemish education. The programme led to an increase in ICT infrastructure in Flemish education, which also improved access to digital education for pupils and teachers: in primary schools there is now more than one device for every two pupils. In secondary education there is even more than one device for every student (desktops, laptops, chrome books or tablets). In primary-schools the devices are mainly used only in the schools. In secondary schools there are different kinds of rental/leasing systems where students get a personal device, also to work at home. **MICTIVO >** | Mediawijs **Digisprong programme >**	Digital funding underpins the **Digital Strategy for Schools** and in the past number of years all primary and post-primary schools in Ireland have received funding to support the effective use of digital technologies in learning, teaching and assessment. Schools have autonomy in how this funding is used and they can determine their own infrastructural requirements. Schools are expected to put in place Digital Learning Plans (DLPs), which outline their goals for digital learning and align their ICT grant expenditure with their overall school planning. Additionally, project funding for digital technologies is available through different initiatives, which schools may apply for. Practice varies in providing access to devices for students and there is not one centralised approach. Some post-primary schools use personal student devices such as tablets in place of text books. Some post-primary schools work with a bring your own device policy, such as phones, to support personal student devices. Many schools in Ireland, provide access to school based digital devices for students to use throughout the school day
Approved Models of AI	There is currently no approved AI model for use in Flemish primary/secondary schools	There is currently no approved AI model for use in Irish primary/post-primary schools.

Table 2: Luxembourg and Scotland

	LUXEMBOURG	SCOTLAND
Structure of Education System	The Luxembourg education system encompasses a variety of levels, including early education, primary, and secondary schooling. Early childhood education may begin as early as age 3 and is divided into two years of compulsory pre-school for ages 4- 5. Primary education, from 6 to 11 years old, includes cycles 2 to 4 of elementary school. Secondary education offers two paths: the classic secondary education (ESC) and general secondary education (ESG). Upon completing secondary education in Luxembourg, students obtain either the Diplôme de fin d'études secondaires from classical secondary education, leading to higher education, or the Certificat de fin d'études secondaires générales from general secondary education, opening paths either to higher and/or further education as well as to vocational careers. Additionally, vocational program graduates receive a Vocational Capacity Certificate or a Technician's Diploma, qualifying them for specific trades or further specialized training.	Education is compulsory for children in Scotland from the ages of 3 to 16. The Scottish education system incorporates early years , primary school and secondary school. **Scotland's Curriculum for Excellence (scotlandscurriculum.scot >)** Early years is age 3 to 5 although some children will start Primary at age 4. Primary education consists of 7 years and Secondary is 6 years, 4 of which are compulsory. Curriculum for Excellence is our curriculum framework which is a guidance framework for ages 3 to 18. This is broken down in to Broad General Education (age 3 to 15) and Senior phase (16 to 18)
Primary Curriculum and Digital Technologies and AI	In Luxembourg, the national primary education curriculum covers 6 distinct development and learning areas/domains: language education—which includes Luxembourgish, French, and German—mathematics, natural and social sciences, the arts, physical education, and Community life and its values. The curriculum is designed to provide a balanced educational experience, fostering academic skills and personal development. The current 2009 curriculum features a transversal competence area called media education, where digital technology and skills are featured. These competences are based on the national media literacy framework, "Medienkompass". **Computational thinking and coding are >** integrated into the mathematic courses in upper primary education There is an ongoing curriculum reform project in Luxembourg, with a new curriculum expected to be introduced in 2026. **https://curriculum.lu/ >** Given that one of the proposed pillars of the new curriculum is "Digitality" (alongside Wellbeing, Multilingualism, & Participation) there's a certain likelihood that AI may be explicitly mentioned in the new curriculum of 2026. **There is currently no explicit reference to AI in the primary curriculum**	There is a national curriculum. Currently, the curriculum is presented in 8 areas, some of which are further subdivided into subjects. These include responsibility of all (Numeracy and Mathematics, Literacy and English, Health and Well Being), Science, Expressive Arts, Technologies, Social studies, Religious and Moral education and Languages. **Curriculum areas | Curriculum for Excellence | Education Scotland >** The Broad General Education is taught throughout early years and primary(technically to year 3 in secondary) and is a competency based framework. Computing science and digital literacy are part of the curriculum from age 3 and have been since 2007 (with a significant review in this are taking place in 2016). **Currently, there is no explicit reference to AI in the curriculum**

	LUXEMBOURG	SCOTLAND
Post-Primary Curriculum and Digital Technologies and AI	There are nationally binding curricula for all of the subjects being taught in Luxembourg's secondary schools. The legislation guiding Luxembourg's schools doesn't specifically mention artificial intelligence. However, it emphasizes the development of "computational thinking" and "digital competencies" as part of children and young people's education As computation thinking and digital competencies are competencies that pupils and students are meant to develop in the course of their schooling, these competencies are either explicit or implicit component-elements of a variety of subjects or study programmes. Elements of digital technology can be found within the curricula of language, mathematics, sciences, and arts courses as well as being the integral part of an entire discipline, such as the newly introduced course called "Digital Sciences" (lower secondary education). Introduced in 2022, **this course covers AI as one of its 6 key topics. In this respect, basics of AI technology, current AI applications as well as ethical aspects are included in the curriculum**.	It is a national curriculum. Currently, the curriculum is presented in 8 areas, some of which are further subdivided into subjects. These include responsibility of all (Numeracy and Mathematics, Literacy and English, Health and Well Being), Science, Expressive Arts, Technologies, Social studies, Religious and Moral education and Languages. The Broad General Education is taught until year 3 in secondary schools and from year 4 to 6 learners will be working towards National Qualifications. There are a range of qualifications on offer relating to digital and a number of these **include elements of learning about creating AI**. **Computing Science – SQA** **NQGA Computer Science / Software / Hardware – SQA >**
Funding to support Digital Technologies and access to devices for students	Digital funding underpins the digital strategy. In primary schools, the municipalities are responsible for the school budget and release budget items at the request of the schools or carry out the purchases. In this context, a wide range of digital education purchases have been made in recent years, including the acquisition of class sets of iPads or laptops and learning-related software. Secondary schools have their own budget with which they can also purchase specialised hardware or software that is not provided nationally. Nationally, iPads or laptops are provided as hardware (rental model) and software (e.g. O365). In the framework of the national "one2one"-strategy, mobile devices such as iPads have been widely introduced in secondary schools. To this end, the Centre de gestion informatique de l'éducation (CGIE) has implemented an ambitious programme for the multi-year acquisition of iPad-type tablets to meet the needs of secondary schools. All requests for mobile devices must be accompanied by a well-crafted pedagogical dossier, including a detailed description of the pedagogical project, which must be supported by a motivated team of teachers. In terms of hardware, the national strategy for making devices available is based on an annual rental model. The annual rental for an iPad is 50 Euro and for a laptop 80 Euro.	Local Authorities(LA) in Scotland receive the funding to deliver and improve education in Scottish schools. LA's have autonomy in how this funding is used and they can determine their own infrastructural requirements. Schools may also have some flexibility in terms of resource but this will be within LA requirements. Additionally, project funding for digital technologies is available through different initiatives, which schools may apply for. Some Scottish LA's have moved to provide 1 to 1 devices for learners in recent years but this has not happened across all 32 LA's. However, many schools in Scotland, provide access to school based digital devices for students to use throughout the school day.

	LUXEMBOURG	SCOTLAND
Approved Models of AI	There is currently no approved AI model for use in Luxembourgish schools.	There is currently no approved AI model for use in Scottish primary/ post-primary schools.

Table 3: Slovenia and Sweden

	SLOVENIA	SWEDEN
Structure of Education System	The Slovenian education system consists of primary, secondary and tertiary education. School leaving qualifications are classified by the Slovenian Qualifications Framework. **Primary education** is provided by public and private kindergartens, basic schools, basic schools with an adapted education programme, music schools and educational institutions for children with special educational needs. According to the legislation of the Republic of Slovenia, all children must necessarily receive basic general education that is to finish primary school. Training is free for both Slovenian citizens and foreign children. Studying at a primary school lasts 9 years at the age of 6 to 15 years. At the end of the 6th and 9th grades, children have to pass the National Knowledge Assessment Test. **Secondary education** is provided by upper secondary schools and secondary schools. It is classified as general or vocational technical and secondary professional or technical education. In secondary vocational educational institutions, students study for 3 years and at the end of the studies, students must pass a final examination. Secondary technical and vocational education lasts 4 years and end with final examinaton (In Slovene: poklicna matura). General secondary education in grammar schools also lasts 4 years and end with General Final Examination called splošna matura. The third segment of education, **tertiary education**, is provided by both public and private institutions. It consists of higher post-secondary vocational education and higher education. Higher post-secondary vocational education is provided by higher vocational colleges, while higher education is provided by faculties, academies and independent higher education institutions	The Swedish education system includes compulsory and non-compulsory education. Most Swedish schools are public, run by the municipalities, but an increasing number of schools are independent. An amount of money is granted and follows each pupil to whatever school they choose, either municipal or independent. A school that receives grants from the municipality is not entitled to collect school fees. For children between 1 and 6 the municipalities offer voluntary pre-school. Education is compulsory for 10 years in Sweden. Children start school when they are 6 (reception/pre-school class) followed by 9 years of schooling which mean they finish compulsory school when they are 15. After compulsory schooling most pupils apply for upper secondary school ('gymnasium') where they study for 3 years in a theoretical or vocational programme and the diploma they receive qualifies them for higher education or a profession respectively. It is also possible to qualify for higher education through a vocational programme. In addition to this we have municipaility funded adult education. This form of education makes it possible for adults who haven't passed compulsory school or need to supplement parts of their secondary education to be able to progress in the education system. Adult education also provides Swedish for immigrants.

	SLOVENIA	SWEDEN
Structure of Education System (continued)		For each part of the system there is a parallel form of education for pupils/students/adults with intellectual disabilities. **Map showing the Educational system >** **Read more about each part of the system >** **Compulsory School for pupils with Intellectual Disabilities >** **Upper Secondary School for Pupils with Intellectual Disabilities >** **Municipal Adult Education for Adults with a Intellectual Disabilities >**
Primary Curriculum and Digital Technologies and AI	We have a national curriculum for primary education. The primary school curricula is currently being revised. The renovation will be completed by 2026. Digital technology has a role to play in the national curriculum for primary education. Among the didactic recommendations, it is stated that teachers should use digital technology in their teaching and that they should also train pupils to use digital technologies in a meaningful way in their learning. **There is no mention of AI in the current curricula**	There is a national curriculum for primary education. Digital competence is part of the Swedish curriculum for primary education. Digital competence for pupils in this context mean: • To be able to use and understand digital tools and media • To have a critical and responsible approach • To understand the societal impact of digital transformation • To be able to solve problems and turn ideas into action Extract translated from these documents. primary and lower secondary school : **https://www.skolverket.se/publikationsserier/kommentarmaterial/2023/fa-syn-pa-digitaliseringen-pa-grundskoleniva >**

	SLOVENIA	SWEDEN
Post-Primary Curriculum and Digital Technologies and AI	We have a national curriculum for post-primary education. The post-primary school curricula is currently being revised. The renovation will be completed by 2026. Yes, digital technology has a role to play in the national curriculum for post-primary education. Among the didactic recommendations, it is stated that teachers should use digital technology in their teaching and that they should also train pupils to use digital technologies in a meaningful way in their learning. **There is no mention of AI in the current curricula**	It is a national curriculum Digital competence is part of the Swedish curriculum for post-primary education Transversal competencies and skills relevant to AI are already present in the Swedish curriculum and were not inserted as a particular response to AI. Among some of them are the ethical perspective, sustainability, critical thinking and creativity. Source criticism and source awareness are mentioned in the curriculum and several subject syllabi, such as civics and language teaching. A critical approach to and responsible use of digital tools is promoted and pupils are encouraged to think about the interaction between technology and society. Starting in the school year 2024/2025, **AI will be offered as an optional subject at the Upper Secondary level**. The subject contains two perspectives, a technical perspective and a societal perspective. It is also adaptable to the programme of the pupils. An AI subject for Upper Secondary school was already in development before the most recent wave of AI interest, however, it will enter into force one year earlier than initially planned to meet demands from stakeholders. It has been positively received by both teachers and pupils. **AI is explicitly mentioned in a few other subjects**, for example in Mathematics specialisation as an optional topic and in a few vocational courses. **For more general aspects of AI, such as AI-literacy, we are currently looking into preambles for social science subjects, among others, if it would be feasible to mention AI more specifically instead of digital competence generically.** *upper secondary school*: **https://www.skolverket.se/publikationsserier/kommentarmaterial/2017/fa-syn-pa-digitaliseringen-pa-gymnasial-niva >** *adult education*: **https://www.skolverket.se/publikationsserier/kommentarmaterial/2020/fa-syn-pa-digitaliseringen-i-vuxenutbildningen >**

	SLOVENIA	SWEDEN
Funding to support Digital Technologies and access to devices for students	Funds for the purchase and investment maintenance of digital equipment are provided from the funds of the state budget for upper secondary and tertiary schools, institutions for children and adolescents with special needs and dormitories for students. Exceptions are primary schools and high schools, whose founders are municipalities. Funds for them are provided by local communities. Primary schools have partial autonomy in the use of these funds. According to the school set goals in their Annual Work Plan, schools use part of the municipal funds for the purchase of basic equipment, classrooms and teaching aids, but mostly they receive the equipment offered by the most favourable bidder in a public tender co-financing from the European Union, the European Fund for Regional Development and the Ministry of Education. Similarly, secondary schools have a certain degree of autonomy in allocating the funds they receive from the funder (Ministry of Education). Based on perceived needs, each school allocates part of these funds for investments in digital resources. There isn't a clear-cut answer to whether every student in Slovenia has a personal digital device for school. While digital technology is emphasized in Slovenian education, it likely involves a mix of school-provided devices and students using their own phones/tablets. It's true that some schools in Slovenia have been equipped with tablets through participation in projects that promoted the meaningful use of digital technology and piloted electronic textbooks. These schools were equipped by the Ministry of Education and Sports. This indicates that the Slovenian government actively supports the use of digital tools in education, although it doesn't necessarily mean every student in the country has their own personal device	Schools are allocated funding per pupil from the municipality and have autonomy in how this funding is used. Every student has access to a personal device. The devices are provided by the school. Schools are allocated funding per pupil from the municipality.
Approved Models of AI	**We do not have any AI models approved for use in primary and post-primary schools.**	**There is currently no approved AI model for use.**

Table 4: Switzerland and The Netherlands

	SWITZERLAND	THE NETHERLANDS
Structure of Education System	Strong state schools with local roots and a high degree of permeability between the different programmes of education Public compulsory education is free of charge for all children. The 26 Swiss cantons are responsible for compulsory education, i.e., until lower secondary education (ISCED 0-2). It amounts to 11 years, eight years primary level and three years lower secondary level. In post-compulsory education (ISCED 3-8) the confederation and the cantons share responsibility and work closely together. The upper secondary education system (ISCED 34+35) allows for two major tracks, i.e., a) the vocation education and training (VET) track and b) the general education track (e.g., baccalaureate) VET tracks have country-wide standardized curricula and lead to a country-wide accepted certificate. When combined with a VET baccalaureate the certificate allows to go to a "university of applied sciences". Moreover, colleges of higher education provide graduates of a VET track with further tertiary education possibilities. The general education track is in the responsibility of the cantons. Accordingly, there is no country-wide standardized baccalaureate. However, the certificate allows graduates to go to any Swiss university, federal institute of technology or university of teacher education. **Graphical Overview >**	Full-time education is compulsory in the Netherlands from the ages of 5 to 16. From ages 16-18, students must attend some form of education for at least two days a week. Mainstream primary education lasts 8 years and is for all children aged 4 to 12. Secondary education encompasses schools providing: • Pre-vocational secondary education (VMBO, duration of 4 years) • Senior general secondary education (HAVO, duration of 5 years) • Pre-university education (VWO, duration of 6 years) VMBO comprises four learning pathways: • the basic pre-vocational programme (BBL), • the middle-management pre-vocational programme (KBL), • the combined pre-vocational programme (GL) and • the theoretical pre-vocational programme (TL). These pathways lead on to vocational programmes (MBO). After completing a combined or theoretical programme, students may also move on to HAVO. HAVO and VWO courses prepare students for tertiary education programmes/higher education (havo: applied sciences and vwo: academic level). **https://eurydice.eacea.ec.europa.eu/national-education-systems/netherlands/overview >**
Primary Curriculum and Digital Technologies and AI	Curricula, teaching material and number of lessons per subject are specified by the cantons. The «Inter-cantonal agreement on harmonisation of compulsory education (HarmoS Agreement)» stipulates a harmonisation of the curricula on the level of the linguistic regions. • French speaking part: «Plan d'études romand (PER)» (5 cantons) • German speaking and multilingual part: «Lehrplan 21» • Italian speaking part: «Piano di studio»	The Dutch law sets primary education core objectives for each learning area. The objectives indicate what children should be offered in education to achieve knowledge and skills by the end of primary school. All children must be enabled to achieve the core objectives. Schools are free to choose appropriate contents, materials and pedagogical approaches.

	SWITZERLAND	THE NETHERLANDS
Primary Curriculum and Digital Technologies and AI (continued)	Because education is locally rooted, tailor-made solutions can be implemented. German and French part reference digital technologies as the curricula has references to the overarching topics «Media», «Informatics» and «Usage» Italian Part: Yes, the curricula has references, to digital technologies. However they reference to a part of the curricula that allows for options. In the generic curricula in all linguistic regions **AI has no explicit reference**. However, cantons have the possibility to go further than the generic curricula. An analysis in some sample cantons results in **no explicit reference to AI**	Compulsory learning areas are: • Dutch; • English; • Arithmetic and mathematics; • Orientation to yourself and the world (including geography, history, biology, citizenship, road safety and political studies); • Arts and culture (including music, drawing and handicrafts); • Movement and sport; • Citizenship (new, core objectives under development); • Digital literacy (new, core objectives under development). NB Frisian is a compulsory subject for primary schools in the province of Friesland In March 2024 new draft core objectives for digital literacy were published by SLO. The new core objectives are expected to be implemented from 2027. The new draft core objectives include specific objectives for digital literacy. They can be divided into three strands: **Strand 1:** Practical knowledge & skills = core objectives 1-5; **Strand 2:** Design and create = core objectives 6-7; **Strand 3:** Interplay between digital technology, digital media, people in society. = core objectives 8-9. **1.** (digital systems) The pupil uses digital systems in a functional way. **2.** (digital media and information) The pupil navigates purposefully the world of digital media and information for acquiring and processing information. **3.** (safety and privacy) The pupil uses digital systems, data and privacy-related matters (own or someone else's) with great safety. **4.** (data) The pupil explores the use of data and data processing. **5.** (artificial intelligence) The pupil explores how Artificial Intelligence systems work. **6.** (creating with digital technology) The pupil uses appropriate strategies when creating different types of digital products. **7.** (programming) The pupil uses computational thinking strategies when programming. **8.** (digital technology, self and others) The pupil makes informed decisions when using digital technology and digital media. **9.** (digital technology, society and the world) The pupil explores how digital technology and society impact each other. Core objective 5 is about **pupils exploring the possibilities and limitations of AI**.

	SWITZERLAND	THE NETHERLANDS
Post-Primary Curriculum and Digital Technologies and AI	Curricula, teaching material and number of lessons per subject are specified by the cantons. The «Inter-cantonal agreement on harmonisation of compulsory education (HarmoS-Agreement)» stipulates a harmonisation of the curricula on the level of the linguistic regions. • French speaking part: «Plan d'études romand (PER)» (5 cantons) • German speaking and multilingual part: «Lehrplan 21» • Italian speaking part: «Piano di studio» Because education is locally rooted, tailor-made solutions can be implemented. *Upper Secondary* Differs across tracks: **General Education track:** Curricula are defined and ratified by the cantons. Some cantons have canton-wide curricula for baccalaureate schools, others have curricula at the school level. However, there is a framework curriculum published by the Swiss Conference of Cantonal Minsters of Education. **VET-track:** The State Secretary for Education, Research and Innovation ratifies for each occupation (around 200 occupations) a nation-wide curriculum that defines both the firm-level training (3-3.5 days a week) and the school-level training (1.5 – 2 days). For occupational curricula, an obligation exists that curricula must be re-evaluated every five years. This should ensure that curricula are up-to-date also with respect to new technologies The VET-schools base their curricula for the school-level part of the track on the content of these nation-wide curricula.	National core objectives for lower secondary education and attainment targets for upper secondary are defined in law and regulations for all strands. Like in primary education, core objectives indicate what children should be offered to achieve knowledge and skills. School boards are responsible for the quality of education, and the achievement of the national targets. In other words, the Dutch education system is on the one hand highly centralised, and on the other hand highly de-centralised. For lower secondary education (ages 12-15) new draft core objectives are being developed which include objectives for digital literacy and build on those developed for primary education. In March 2024 both sets (primary and lower secondary education) were published in one document. They were developed together with teachers from primary and lower secondary education and other experts in the field of digital literacy, coordinated by the Dutch institute for curriculum development SLO. Since 2022, a comprehensive revision of the national examination programmes for all strands of upper secondary education has been taking place. Relevant aspects concerning digital literacy and the use of digital technology will be incorporated in the attainment targets for the different subjects. Evaluation and trial phase of the new targets will take place from 2025 onwards. The **current** core objectives and attainment targets **do not contain any explicit reference to AI** but in the **new objectives specific attention is paid to AI in core objective** 5, building on core objective 5 for primary: **PRIMARY EDUCATION**: 5.The pupil explores how Artificial Intelligence systems work. **LOWER SECONDARY**: 5. The pupil explores the possibilities and limitations of Artificial Intelligence.

	SWITZERLAND	THE NETHERLANDS
Post-Primary Curriculum and Digital Technologies and AI (continued)	*Digital Technologies in Lower Secondary* German and French part: The curricula has references to the overarching topics «Media», «Informatics» and «Usage» Italian Part: The curricula has references, however they reference to a part of the curricula that allows for options. *Digital Technologies in Upper Secondary* **General Education track:** The **framework curricula >** contains information on digital technologies. Moreover, there is an explicit supplementary **document >** linked to the curricula that focuses on informatics. **VET-track:** The part of the nation-wide curricula that covers general education does explicitly mention digital technologies For the occupation-specific parts of the curricula it is difficult to say, since there are over 200 specific curricula. Many of them will for sure contain content on digital technologies, e.g. curricula on occupations such as «Information scientist», «business data processing specialist», «cyber security specialist». *Explicit reference to AI* *Lower Secondary* German and Italian part: In the generic curricula in all linguistic regions **AI has no explicit reference**. However, cantons have the possibility to go further than the generic curricula. An analysis in some sample cantons results in no explicit reference French part: **There is an explicit reference to AI w.r.t** the learning goal of «distinguishing the influences of digital technologies at the societal, economic and environmental level» *Upper Secondary* **General Education track:** The **framework curricula >** references AI in the part where the goals regarding informatics are defined. One of the basic knowledges should be: «Comparing human thinking with thinking models in artificial systems». Given that curricula in general education depend on the cantons **it is not clear, whether cantonal curricula make additional references to AI**. **VET-track:** The part of the nation-wide curricula that covers general education **does not explicitly reference to AI**. For the occupation-specific parts of the curricula it is difficult to say, since there are over 200 specific curricula.	

	SWITZERLAND	THE NETHERLANDS
Funding to support Digital Technologies and access to devices for students	There are no standardized rules regarding funding. In particular in compulsory education since this is largely financed by municipalities and cantons. No standardized rules regarding the provision and funding of digital devices. In particular in compulsory education since this is largely financed by municipalities and cantons.	Schools are very autonomous in choosing their materials. No difference is made between digital and non-digital resources. Primary schools receive a budget for providing good education via a lump sum funding model. The lump sum is intended to finance staff, housing and material costs for teaching. Within the legal framework of the Netherlands, school boards can allocate the available resources at their own discretion to achieve their educational goals. The funding of primary education (including special schools for primary education) is governed by the **Primary Education Act >** (in Dutch). The funding of secondary schools is governed by the **Secondary Education Act >** (WVO). Schools receive a block grant consisting of a staff component and a component for operating costs. Block grant funding provides the competent authority with more freedom to decide how resources are allocated and also to negotiate staff salaries and conditions. (Negotiations on salary and conditions in secondary education are partly decentralised.) Schools are free to decide to purchase digital device from their school budget
Approved Models of AI	There is currently **no approved AI model** in Switzerland for use across all primary/post-primary schools.	**No**

Table 1: Belgium (Flanders) and Ireland

BELGIUM (FLANDERS)

Flemisch AI Strategy for employees of the Flemish government:

https://assets.vlaanderen.be/image/upload/v1708532045/principedocument_-_210224bis_ntcxb8.pdf >

There are 6 guiding principles to the use of AI which include democratic, reliable, human-orientated, correct use and management of data, sustainability and applied with expert knowledge below and which are embodied in the this slogan:

"AI within governments in Flanders is democratic, reliable, people-oriented and sustainable, with correct use and management of data and applied with expert knowledge."

The Flemish government is allocating 32 million euros over several years to propel Flanders to the forefront of artificial intelligence (AI). This plan focuses on three key areas: advancing research, promoting AI applications in industry, and establishing supportive policies. The aim is to leverage Flanders' strengths and adopt leading AI technologies. The plan includes strengthening research excellence, fostering AI applications in businesses through knowledge sharing, and promoting education and ethical awareness through training initiatives and an AI Think Tank.

Read more: **Broad context | Departement EWI (ewi-vlaanderen.be) >**

Here you can find an infographic about guidelines for the use of public accessible gen AI:

https://assets.vlaanderen.be/image/upload/v1709554566/AI-Richtlijnen_VO_02_1_tpya3r.pdf >

IRELAND

Ireland's **National AI strategy**, **Irelands National Artificial Intelligence Strategy for Ireland: AI - Here for Good >**,was launched in July 2021. The strategy provides a high-level direction to the design, development and adoption of AI in Ireland and is divided into eight strands: AI and Society, A Governance Ecosystem that Promotes Trustworthy AI, Driving Adoption of AI in Irish Enterprise, AI Serving the Public, A Strong AI Innovation Ecosystem. AI Education, Skills and Talent, A Supportive and Secure Infrastructure for AI and Implementation of the Strategy.

The strategy sets out how Ireland can be an international leader in AI to benefit our economy and society, through a people-centred, ethical approach to its development, adoption and use.

LUXEMBOURG

https://gouvernement.lu/dam-assets/fr/publications/rapport-etude-analyse/minist-digitalisation/Artificial-Intelligence-a-strategic-vision-for-Luxembourg.pdf >

Luxembourg's **strategic vision** for integrating artificial intelligence (AI) into its national development emphasizes the importance of AI in fostering innovation, economic growth, and societal well-being. The strategy focuses on ethical considerations, ensuring AI developments align with Luxembourg's values and legal frameworks (human-centered AI). Key areas for AI application include healthcare, public administration, and the economy, with an emphasis on education and workforce development to prepare for AI-driven changes. The government commits to supporting research, development, and international collaboration to position Luxembourg as a leader in ethical and innovative AI use.

SCOTLAND

Artificial intelligence strategy: trustworthy, ethical and inclusive – gov.scot (**www.gov.scot >**)

Our Strategy marks a new chapter in Scotland's relationship with artificial intelligence. It is the result of an extensive consultation and engagement programme involving academia, industry, the public sector and the people of Scotland who were generous with their time, contributing ideas, insights and opinion on AI. Their knowledge and expertise have helped to shape the Strategy and we're grateful for the input of everyone who was part of this process. Executive Summary We believe the significance of the Strategy lies in the fact that it looks beyond the technology itself to focus more closely on AI's role in our society. Much of what we take for granted today happens because AI is working behind the scenes, driving change and technological innovation on an unprecedented scale. However, the use and adoption of AI should be on our terms if we are to build trust between the people of Scotland and AI. The purpose of this Strategy is to help us realise our vision: Scotland will become a leader in the development and use of trustworthy, ethical and inclusive AI. Our Strategy makes a compelling case for sustained investment in Scotland's AI ecosystem. Our universities, research institutes and tech businesses are worldclass, however in the global race to adopt AI we can't afford to fall behind. Scotland should be a leader in AI technologies and we have identified the actions we'll take to achieve this: These key actions are set out in a detailed roadmap, which confirms immediate and longer-term priorities as the Strategy is launched and rolled out across Scotland. We are also introducing the Scottish AI Playbook - an open guide to the principles, practices and actions we will adopt to realise our vision. For the first time, everything you need to know about AI in Scotland can be found in one indispensable digital resource. Our Strategy makes it clear that when it comes to AI, Scotland means business. If you work in AI, are involved in a business that is adopting AI technologies or would like to learn more about the role it plays in our lives, we hope you find our Strategy informative and inspiring.

SLOVENIA

Slovenia has been actively involved in the development and use of artificial intelligence (AI) in research organizations and higher education programs for the past 40 years. In the desire to build on research achievements in the field of AI in Slovenia and to become internationally recognized in this field, the government adopted the **National Program for the Promotion of the Development and Use of AI until 2025 >** in May 2021. The program represents the foundation for system support, regulation and implementation of all activities related to artificial intelligence in the country.

The program is coordinated with the European plan Harmonized plan for artificial intelligence, the proposal for the Regulation of the European Parliament and the Council on the establishment of the Program for Digital Europe for the period 2021-2027, which also includes the field of AI, and with the OECD principles on artificial intelligence, which promotes artificial intelligence, which is trustworthy, respects human rights and democratic values.

The national artificial intelligence program is also consistent with the overall **Development Strategy of Slovenia >** 2030, with the key objectives of the **Digital Slovenia 2020 information society development strategy >** and with some of the key objectives of the **Smart Specialization Strategy >**.

The areas of basic and applied AI solutions are financed from the resources of the Public Agency for Research Activity of the Republic of Slovenia. Funds are decreasing from year to year and researchers are practically left to the success of obtaining funds from EU tenders. The field of AI is strongly represented in higher education institutions, especially in the faculties of electrical engineering, computer science and informatics. We are lagging behind in the inclusion of computing and informatics in primary and secondary school programs. Another problem we are facing is staff shortage. Slovenia has many experts working in the fields of machine learning, data science, language technologies, robotics and other fields, but more and more young researchers are going to foreign universities or to the economy. On the other hand, more and more job opportunities are opening up in the field of robotics and in the ICT sector.

SLOVENIA (continued)

For this purpose, the AI4SI initiative was created as a connecting link between AI solution providers and companies that want to use it in their work. We are also proud of a new International Research Center on Artificial Intelligence under the auspices of UNESCO, based in Ljubljana. The aim of establishing the Center for Artificial Intelligence is to stimulate research, technology development and innovation in this field at the international level

SWEDEN

There is currently no national policy for AI. However, there are examples of policy documents expressing high ambitions regarding Sweden's digital transformation and the importance of AI as it relates to higher education, research and innovation.

The Swedish government has set up a national AI commission to promote competetiveness and the safe use of AI.

There are several national networks related to AI, for example "The Swedish AI Agenda", with 25 proposals on an accelerated adoption of AI, involving participants from academia, the public sector and the private sector. The proposals relate to infrastructure, civil society, industry, research and education.

SWITZERLAND

- In 2020, the federal government has developed **guidelines for the use of AI in the federal administration**.
- The guideline should provide a general frame of reference for federal agencies and external partners entrusted with governmental tasks. The guidelines must be adhered to in the following specific contexts:
- When developing sectoral AI strategies;
- When introducing or adapting specific, sectoral regulations;
- When developing and using AI systems within the Federal Administration;
- When helping to shape the international regulatory framework on AI.
- Source: **https://www.sbfi.admin.ch/sbfi/en/home/eri-policy/eri-21-24/cross-cutting-themes/digitalisation-eri/artificial-intelligence.html >**

THE NETHERLANDS

The Dutch government has presented a vision on generative AI to emphasise the urgent need for action. The vision can be found on the following page:

Dutch government presents vision on generative AI | News item | Government.nl > Dutch vision

Table 2: National Laws/Policies/Guidelines on AI in Education

BELGIUM (FLANDERS)

Here you can find the opinion text about responsible AI in education:

https://www.vlaanderen.be/publicaties/responsible-ai-in-flemish-education-a-collaborative-process-from-development-to-use >

We highlight the most important topics:

Responsible AI in education is crucial for ensuring positive outcomes and ethical practices. The 7 basic conditions that must be met:

1. **The learning process of the learner is paramount:** Responsible AI prioritizes the learner's learning process. It considers pedagogical, didactic, and social-emotional aspects. All stakeholders (teachers, learners, parents) play a role in shaping the learning process.
2. **AI is not an end in itself:** AI should serve educational goals and add value. It's not an end in itself.
3. **AI applications in education are trustworthy:**
   - Human Autonomy and Control: AI respects fundamental rights and human actions.
   - Transparency: AI systems should be traceable and explainable.
   - Diversity and Non-Discrimination: AI should be accessible to all, regardless of age, gender, or abilities.
   - Social and Environmental Well-Being: Consider sustainability, social impact, and democracy.
   - Privacy and Data Management: Respect privacy, data quality, and integrity.
   - Technical Robustness and Safety: Ensure resilience, security, accuracy, and reliability.
   - Accountability: Minimize negative consequences and provide transparency.
4. **AI applications in education are based on shared values:** AI applications in education should align with values like quality education, teacher autonomy, and user privacy. A value framework helps communicate impact.
5. **Responsible AI is a continuous process:** Responsible AI is continuous. Education, developers, and policymakers must collaborate to apply moral and ethical principles.
6. **Education has a support network that is AI-ready and AI-resilient:** Education needs a resilient network for sharing knowledge and resources related to AI.
7. **Professionalisation and responsible AI go hand in hand:** Teachers, employees, and learners need digital literacy to navigate AI effectively.

Balancing technology's possibilities and potential negative effects is essential. Responsible AI requires collective effort from education, developers, and policymakers.

Here you can find some ethical guidelines concerning AI: **https://www.vlaanderen.be/kenniscentrum-digisprong/themas/innovatie/artificiele-intelligentie/ai-in-het-onderwijs-waarom-zijn-ethische-richtlijnen-nodig#waarom-heeft-het-onderwijs-ethische-richtlijnen-nodig >**

Here you can find some guiding questions to decide on AI-programmes: **https://www.vlaanderen.be/kenniscentrum-digisprong/themas/innovatie/artificiele-intelligentie/concrete-vragen-om-ai-programmas-te-evalueren-kiezen-en-gebruiken >**

IRELAND

Ireland's does not have a policy on AI in education. However, there is strand dedicated to AI, Education, Skills and Talent within the national AI strategy, **Irelands National Artificial Intelligence Strategy for Ireland : AI - Here for Good >**.

This Strategy sets out a roadmap to ensuring that Ireland has a future-oriented workforce and population with the skills to drive the development, deployment and use of AI to increase productivity and benefit society. This will be achieved within the primary and post-primary education system, by teaching digital and technical skills.

LUXEMBOURG

National media competence framework including AI and data literacy: **https://www.edumedia.lu/wp-content/uploads/2023/02/Medienkompass_EN_web-1.pdf >**

The "Medienkompass" is a comprehensive guide aimed at integrating media competence, including data and AI literacy, into educational settings in Luxembourg. It defines AI and data literacy, emphasizing the need for critical evaluation, effective communication, and responsible use of AI technologies. The guide outlines specific competencies across different educational levels, offering practical examples and suggesting ways to implement these skills in the classroom. It stresses the importance of preparing students to navigate and shape the digital world ethically and knowledgeably, incorporating AI and data literacy into the broader framework of media education. This strategic approach ensures that learners are equipped with the necessary tools to critically engage with digital technologies, understand the underlying principles of AI, manage data effectively, and participate responsibly in a digitally driven society.

SCOTLAND

Artificial intelligence strategy: trustworthy, ethical and inclusive - gov.scot (www.gov.scot) >

pg 32 2.11 We will lead a skills plan to ensure everyone has access to AI learning opportunities in our education system and improve the way businesses use, develop and adopt AI.

SLOVENIA

Slovenia has undertaken several initiatives and established frameworks to promote the use of artificial intelligence (AI) in education, ensuring that digitalization supports learning and teaching in meaningful ways.

Frameworks:

Digitalizacija družbe | GOV.SI > | **Nacionalni_program_za_UI_do_2025.pdf >**

Projects

- AI4T project – AI for teachers
- PUMICE
- Javni razpis Razvojni projekt – Uporaba generativne umetne inteligence za in v izobraževanju (**gov.si >**)
- KOBI - https://www.dnevnik.si/1043018843

Indirektni projekti:

- B-RIN
- IP 5.0

KATARINA (The KATARINA project, led by the University of Ljubljana's Faculty of Computer Science and Informatics, aims to equip secondary school students with foundational knowledge in computer science and informatics. The project collaborates with ten secondary schools and several external partners.)

SWEDEN

Due to the decentralised nature of our educational system, there is no national law or policy on AI in education.

SWITZERLAND

Since the Swiss educational system at the primary and lower secondary level is regulated at the cantonal level, the 2020 federal guidelines on AI, linked in the previous table, does not apply to a large part of the educational system.

An example of a non-binding guideline for the educational sector based on legal best practices was published by the canton of Zurich: **https://www.zh.ch/de/wirtschaft-arbeit/wirtschaftsstandort/innovation-sandbox/ki-in-der-bildung-rechtliche-best-practices.html >**

THE NETHERLANDS

There is no national policy on AI in education yet in the Netherlands, but there are developments that could eventually lead to national policy, such as the formulation of national educational goals for digital literacy mentioned in the first section of this form.

At the time of writing there are no specific laws or policies in the Netherlands that exclusively deal with artificial intelligence in education. However, there are laws that may apply to the use of technology and data in educational context, such as General Data Protection Regulation.